

Course GISC 6389: Master's Research
Professor Dr. Fang Qiu
Professor in GIS and Remote Sensing
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Meetings TBD, GR 3.212

Professor's Contact Information

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I use eLearning for this class. Please contact me through eLearning email for all class related issues.

General Course Information

Preamble Your project must be professionally prepared and represent defendable research in the geospatial information sciences. This is the capstone course of your GIScience Master's education. Therefore, you need to demonstrate that you can make use of the theories and methodologies of GISciences in an informed manner to address your spatial problem, answer your spatial research questions and/or develop your spatial analysis methodologies and techniques.

Topic Selection and Advisors' Roles The Master's Research is different from any other course you have taken in the GISc program. The project is the synthesis of your previous course work. You must demonstrate that you are able to apply the acquired theoretical GISc knowledge, practical spatial analyses skills and/or programming techniques on a problem of your

choice. Therefore, you need to [a] formulate a well-defined project objective with a specific problem statement, [b] design a feasible approach of addressing the project's problems, [c] obtain the required data, [d] execute the project independently with the guidance of your directing supervisor and [e] finally document and efficiently communicate every step of your project and its findings. Your directing supervisor(s) functions in an advisory capacity: she/he helps you to stay focused and to circumvent major pitfalls. To keep your motivation up, make sure that you select a suitable GISc topic that interests you, which you can complete with your current set of skills and within the available timeframe. The comprehensive nature of a Master's Research clearly mandates that it has a higher level of sophistication and rigor than, for instance, the GISc workshop and any other end of semester take-home assignments. In order to bring your project to a successful completion you need to stay focused throughout the semester.

Select a directing supervisor from the GISc faculty who is in general familiar with your project's topic, its methodology and associated data structures. Aside from your directing supervisor, other GISc faculty members are happy to discuss your project with you. In addition to your directing supervisor, the coordinator of the GISc6389 will be your second resource person, who will facilitate the proposal formation, work progress, and the final defense of your Master's project. Bear in mind that the GISc faculty collectively will evaluate your project presentation at the end of the semester.

The best way to prepare yourself for the project presentation is to show your direct supervisor throughout the semester your progress, document every step as soon as it is completed and incorporate feedback and constructive criticism. While this does not guarantee a successful defense, a close interaction between student and supervisor as well as disciplined work usually leads to a showcase project.

**What
Constitutes a
GIScience
Project?**

- A properly specified objective and problem statement, which you intend to address in your Master's project:
 - o Be as clear as possible here. Should you not be able to formulate a problem statement, then you will not be able to design and execute a solution strategy.
 - o The problem **must** be of spatial relevance, that is, it has an underlying spatial dimension, and a degree of sophistication.
- Design your solution strategy from a general GIScience analysis and methodology perspective and then treat your specific problem as a case study. That is, you move from a more general and theoretical perspective to a more specific one related to your case study.
- Your Master's project demonstrates
 - o that you have command over the GISc theories and literature related to your research objective; and
 - o that you can use proper GIScience terminology and the specific professional language which is associated with the problem of your particular case study.
- Your project needs to explicitly state all the assumptions that you need to make during the execution of your project.
- Your project requires a proper and critical data preparation:
 - o Provide the meta-information about the used and available data.
 - o Explored the data for any spatial and contextual coding errors and other inherent data problems. Are there inconsistencies in the data? What is the quality of the data?
 - o Check whether particular observations need to be filter out because they are irrelevant for the particular problem or would bias your results.
 - o Make sure that the data types as well as spatial and temporal scales are selected appropriately for your analysis and match your project's purpose.

- o Make sure that the different thematic layers and their spatial scales as well as collection dates match up properly?
- o Furthermore, identify yet unavailable information that would enhance your study?
- Provide a contextual background discussion on the study area and/or the problem under investigation.
- Properly use GIScience methodologies to address the research objective:
 - o You have choices and therefore need to justify the methods that you use to answer your questions.
 - o Be aware of more advanced methodologies, but stick to what you feel comfortable with. You usually won't have time to learn and test new methodologies unless this is the explicit objective of your project.
 - o You need to be able to explain the underlying concept of any method that you are using.
 - o Your study and its results need to be reproducible. Therefore, document each step thoroughly.
- If you develop and/or implement algorithms and programs then explain those and their associated data structures. Evaluate the performance of your algorithm thoroughly. Make use of proper software engineering practices.

Procedure to Register for GISC6389 (under revision and not fully enforced yet)

You need permission to register for the Master's Research (GISC6389). Therefore, contact your selected directing Mater's project supervisor and the course coordinator at least a few weeks prior to the semester in which you plan to register for GISC6389. This applies in particular during the shorter summer semesters.

Registration Steps:

1. Check with your GISc Master's advisor to ensure that you will have the sufficient credit hours and all required coursework in place to

graduate by the end of semester in which you are defending your Master's project. If course work, which is relevant to your project, is still missing, then you may not be able to register you for GISC6389.

2. Contact – or find, if you have not already done so – a directing project supervisor and discuss your project ideas with her/him. Should you not be able to find a supervisor, then the course coordinator, who also can function as your direct supervisor, will assign you in consultation with the GISc faculty to a directing supervisor.
3. Your project supervisor must agree with your proposed idea. With her/his signature she/he approves the proposal and confirms that she/he will supervise you on your intended project.
4. Forward the approved proposal to the course coordinator. Only once you have an approved proposal, a directing project supervisor and the required coursework in place, permission to register for GISC6389 can be granted.

Important Notes:

- Due to the special nature of this course, late registrations for GISC6389 can only be allowed under exceptional circumstances.
- Follow the rules of academic conduct <http://www.utdallas.edu/judicialaffairs/>.
- The University requires that you conduct all official university correspondence with your UTD email account. Make sure that your UTD account is functional and that you check it on a regular basis.
- Remember, if you intend to graduate at the end of the semester, then you would need to **apply for graduation** on time to avoid late fees (see the Academic Calendar of that semester for the deadline).

**After
Registration
to GISC6389**

The GISC6389 class will meet two to three times during the semester in formal settings and in addition by appointment with the instructor. These meetings will be announced at least a week prior to the scheduled time by email. Usually these meetings will be held on Friday afternoons. Ignore the time and location in the course calendar. The main objective of the first meeting is that you present your proposed idea with its underlying data and selected methodology and expose it to a critical class discussion. A progress report/presentation needs to be submitted to show your intermediate results and discussing the relevant literature follow the first meeting. A final meeting aims at improving [a] the structure of your presentation and [b] the communication of your findings. You are expected to prepare a presentation for each meeting. You should also work closely with your direct supervisor in-between the general class meetings.

The defenses of your Master's project in form of a formal presentation are usually scheduled during the Finals week at the end of the semester. They are conducted in a public setting. A defense consists of a full-fledged 30 to 35 minutes research presentation. Subsequently, the candidate will answer project related questions which are raised by the attending GISc graduate students and faculty.

Presentation Guidelines:

**The Master's
Project
Presentation**

- Always have the audience in mind. You need to communicate your project so that the audience can follow your arguments and results.
- Make sure that you organize your presentation in a logical order.
- Group related slides visually together so the audience always knows where you are in your presentation.
- Rather than overloading single slides, use separate zoom-in slides and then return to their parent slide.
- Add page numbers, so the audience can refer to a particular slide if they have questions.

- Use of the power of visual communications: use conceptual diagrams, such as flow charts, organizational charts, decision tree and matrices, mind-maps etc. whenever possible.
- Use animations rather than live software demonstrations to avoid potential disruptions due to technical problems.
- Review every step of our analysis for your audience and do not skip relevant steps in your presentation. Remember, while you are the expert, the audience needs to be able to follow your arguments.
- For formulas explain each term and properly typeset the used mathematical equations. Make sure that the notation is consistent. You may also use conceptual diagrams highlighting the relationships between the inputs into a formula and its output.
- Make sure that the style and format of your presentation, maps, and graphs is consistent.
- Present your results in an unambiguous and unbiased manner.
- Discuss any relevant spatial relationships.
- Support your arguments with proper maps, figures and supporting statistics.
- Discuss every map, figure and statistic that you present. Remember: If it is not worth discussing then it is not worth showing.
- For programming and database projects provide:
 - o the pseudo code;
 - o flowcharts and organizational charts of your algorithm and data structures, respectively;
 - o all relevant equation;
 - o a test of your implementation with well-designed and scaled training datasets;
 - o performance statistics on the consumed computing resources (i.e., elapsed time in relation to the number of available parallel processes and memory consumption) and identify bottlenecks.
 - o a presentation that satisfies the standards of software engineering.

- The conclusions should entail:
 - o A summary of your findings and results.
Note: a project without results/findings is an incomplete project.
 - o A discussion of general implications of your study.
 - o A discussion where else your proposed solution strategy can be applied.
 - o A discussion of conceivable variations of the project's execution.
 - o A discussion of any shortcomings and possible improvements of your project, if sufficient resources would have been available. Note:
 - § It is **acceptable** to have shortcomings, to make somewhat unrealistic assumptions or to work with imperfect data as long as you are aware of these problems and know how they impact your results.
 - § However, it is **unacceptable** that these shortcomings are easily correctable and you just missed performing these corrections.

Evaluation of the Master's Project

The GISc faculty, who is attending the presentations, will jointly evaluate the execution of research project, the oral presentation as well as the candidate's response to questions. The GISc faculty will subsequently vote to pass or fail the student's defense. If stipulated by the GISc faculty, a candidate may then be required to make minor changes to her/his presentations. Once the directing supervisor has approved these revisions, the defense is passed.

However, a student who fails the project defense may still pass the project as long as the students have a good proposal and an acceptable midterm progress report. The student will need to defend the project in the future semesters, usually by signing up an independent study with his/her directing supervisor.

The Thesis Option

It sometimes becomes apparent during the work on a Master's project that the student and her/his supervisor feel that the project has the potential to mature into a written Master's thesis. Bear this option in mind when you work on your Master's project. Writing a Master's thesis will distinguish you beyond completing a Master's project. Should you intend to enter doctoral program at a later time, be aware that most graduate programs in North America require that applicants have written a Master's thesis. Be aware that proceeding with thesis option may delay your graduation by one semester. Talk with your direct supervisor before the University's narrow timeframe during a semester of changing the graduation status expires. More details on the Master's thesis can be found in the GISc Master's thesis guideline (link added later).

Assignments & Academic Calendar

[Topics, Reading Assignments, Due Dates, Exam Dates]

8/26	Course introduction, presenting initial idea for project
10/14	Proposal Due.
7/16	Midterm progress report due with literature review, methodology, and preliminary results
12/9 (Tentative)	Final Project Presentation (9 am-12 pm) and Final Report and Powerpoint Due at 11:59 pm

Course Policies

Classroom Citizenship

Students are expected to display a positive attitude toward learning by paying attention (e.g. not sleeping), conducting themselves with civility and respect for others (e.g., sharing thoughts and actively listening to the thoughts and comments of peers and the instructor), and general good, courteous behavior. Please make sure you turn off your cell-phone before coming to the classroom. Viewing anything that is not related to class and communicating with other using instant messenger are prohibited during the class.

**Student
Conduct
and
Discipline**

The University of Texas System and The University of Texas at Dallas have rules and regulations for the orderly and efficient conduct of their business. It is the responsibility of each student and each student organization to be knowledgeable about the rules and regulations which govern student conduct and activities. General information on student conduct and discipline is contained in the UTD publication, *A to Z Guide*, which is provided to all registered students each academic year.

The University of Texas at Dallas administers student discipline within the procedures of recognized and established due process. Procedures are defined and described in the *Rules and Regulations, Board of Regents, The University of Texas System, Part 1, Chapter VI, Section 3*, and in Title V, Rules on Student Services and Activities of the university's *Handbook of Operating Procedures*. Copies of these rules and regulations are available to students in the Office of the Dean of Students, where staff members are available to assist students in interpreting the rules and regulations (SU 1.602, 972/883-6391).

A student at the university neither loses the rights nor escapes the responsibilities of citizenship. He or she is expected to obey federal, state, and local laws as well as the Regents' Rules, university regulations, and administrative rules. Students are subject to discipline for violating the standards of conduct whether such conduct takes place on or off campus, or whether civil or criminal penalties are also imposed for such conduct.

**Academic
Integrity**

The faculty expects from its students a high level of responsibility and academic honesty. Because the value of an academic degree depends upon the absolute integrity of the work done by the student for that degree, it is imperative that a student demonstrate a high standard of individual honor in his or her scholastic work.

Scholastic dishonesty includes, but is not limited to, statements, acts or omissions related to applications for enrollment or the award of a degree, and/or the submission as one's own work or material that is not

one's own. As a general rule, scholastic dishonesty involves one of the following acts: cheating, plagiarism, collusion and/or falsifying academic records. Students suspected of academic dishonesty are subject to disciplinary proceedings. Plagiarism, especially from the web, from portions of papers for other classes, and from any other source is unacceptable and will be dealt with under the university's policy on plagiarism (see general catalog for details). This course will use the resources of turnitin.com, which searches the web for possible plagiarism and is over 90% effective.

Email Use

The University of Texas at Dallas recognizes the value and efficiency of communication between faculty/staff and students through electronic mail. At the same time, email raises some issues concerning security and the identity of each individual in an email exchange. The university encourages all official student email correspondence be sent only to a student's U.T. Dallas email address and that faculty and staff consider email from students official only if it originates from a UTD student account. This allows the university to maintain a high degree of confidence in the identity of all individual corresponding and the security of the transmitted information. UTD furnishes each student with a free email account that is to be used in all communication with university personnel. The Department of Information Resources at U.T. Dallas provides a method for students to have their U.T. Dallas mail forwarded to other accounts.

Withdrawal from Class

The administration of this institution has set deadlines for withdrawal of any college-level courses. These dates and times are published in that semester's course catalog. Administration procedures must be followed. It is the student's responsibility to handle withdrawal requirements from any class. In other words, I cannot drop or withdraw any student. You must do the proper paperwork to ensure that you will not receive a final grade of "F" in a course if you choose not to attend the class once you are enrolled.

**Student
Grievance
Procedures**

Procedures for student grievances are found in Title V, Rules on Student Services and Activities, of the university's *Handbook of Operating Procedures*. In attempting to resolve any student grievance regarding grades, evaluations, or other fulfillments of academic responsibility, it is the obligation of the student first to make a serious effort to resolve the matter with the instructor, supervisor, administrator, or committee with whom the grievance originates (hereafter called "the respondent"). Individual faculty members retain primary responsibility for assigning grades and evaluations. If the matter cannot be resolved at that level, the grievance must be submitted in writing to the respondent with a copy of the respondent's School Dean. If the matter is not resolved by the written response provided by the respondent, the student may submit a written appeal to the School Dean. If the grievance is not resolved by the School Dean's decision, the student may make a written appeal to the Dean of Graduate or Undergraduate Education, and the dean will appoint and convene an Academic Appeals Panel. The decision of the Academic Appeals Panel is final. The results of the academic appeals process will be distributed to all involved parties.

Copies of these rules and regulations are available to students in the Office of the Dean of Students, where staff members are available to assist students in interpreting the rules and regulations.

**Incomplete
Grades**

As per university policy, incomplete grades will be granted only for work unavoidably missed at the semester's end and only if 70% of the course work has been completed. An incomplete grade must be resolved within eight (8) weeks from the first day of the subsequent long semester. If the required work to complete the course and to remove the incomplete grade is not submitted by the specified deadline, the incomplete grade is changed automatically to a grade of **F**.

**Disability
Services**

The goal of Disability Services is to provide students with disabilities educational opportunities equal to those of their non-disabled peers. Disability Services

is located in room 1.610 in the Student Union. Office hours are Monday and Thursday, 8:30 a.m. to 6:30 p.m.; Tuesday and Wednesday, 8:30 a.m. to 7:30 p.m.; and Friday, 8:30 a.m. to 5:30 p.m.

The contact information for the Office of Disability Services is:

The University of Texas at Dallas, SU 22
PO Box 830688
Richardson, Texas 75083-0688
(972) 883-2098 (voice or TTY)

Essentially, the law requires that colleges and universities make those reasonable adjustments necessary to eliminate discrimination on the basis of disability. For example, it may be necessary to remove classroom prohibitions against tape recorders or animals (in the case of dog guides) for students who are blind. Occasionally an assignment requirement may be substituted (for example, a research paper versus an oral presentation for a student who is hearing impaired). Classes enrolled students with mobility impairments may have to be rescheduled in accessible facilities. The college or university may need to provide special services such as registration, note-taking, or mobility assistance.

It is the student's responsibility to notify his or her professors of the need for such an accommodation. Disability Services provides students with letters to present to faculty members to verify that the student has a disability and needs accommodations.

Individuals requiring special accommodation should contact the professor after class or during office hours.

Religious Holy Days

The University of Texas at Dallas will excuse a student from class or other required activities for the travel to and observance of a religious holy day for a religion whose places of worship are exempt from property tax under Section 11.20, Tax Code, Texas Code Annotated.

The student is encouraged to notify the instructor or activity sponsor as soon as possible regarding the absence, preferably in advance of the assignment. The

student, so excused, will be allowed to take the exam or complete the assignment within a reasonable time after the absence: a period equal to the length of the absence, up to a maximum of one week. A student who notifies the instructor and completes any missed exam or assignment may not be penalized for the absence. A student who fails to complete the exam or assignment within the prescribed period may receive a failing grade for that exam or assignment.

If a student or an instructor disagrees about the nature of the absence [i.e., for the purpose of observing a religious holy day] or if there is similar disagreement about whether the student has been given a reasonable time to complete any missed assignments or examinations, either the student or the instructor may request a ruling from the chief executive officer of the institution, or his or her designee. The chief executive officer or designee must take into account the legislative intent of TEC 51.911(b), and the student and instructor will abide by the decision of the chief executive officer or designee.

**Off-
Campus
Instruction
and Course
Activities**

Off-campus, out-of-state, and foreign instruction and activities are subject to state law and University policies and procedures regarding travel and risk-related activities. Information regarding these rules and regulations may be found at http://www.utdallas.edu/BusinessAffairs/Travel_Risk_Activities.htm. Additional information is available from the office of the school dean.

These descriptions and timelines are subject to change at the discretion of the Professor.